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OBSERVATIONS ON

GENERAL PARALYSIS OF THE INSANE

AND ON THE

Morbid Changes found on Post-Mortem Examination of the Spinal Cord.

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Morbid Changes found on Post-Mortem Examination of the Spinal Cord.

The following observations are mainly the result of the author's experience during twenty years in the Somerset County Asylum ; many of them have appeared from time to time in his annual reports of that institution.

In the first annual report for 1848 it is stated that the *general paralysis of the insane*, a very fatal complication of insanity, was found to have been in fatal cases dependent on, or accompanied by, inflammation of the spinal cord. This has in a great degree guided the treatment, and one of the cases seemed to be benefited by cupping, repeated blistering of the spine, &c. The patient, from his importunity, was probably allowed to get up too soon, and he had a relapse and died. On examination after death, extensive inflammation of the membranes of the spinal cord and brain was found to exist ; also inflammation of the lungs, which so frequently cuts short life in those long confined to the recumbent position. It is remarkable that percussion over the spine did not give any evidence of pain, but on the application of a hot sponge pain was immediately manifested.

Previous experience in a very extensive and varied field of observation at the St. Marylebone Infirmary, and with the co-operation of some very able and accurate inquirers, led the writer to the conclusion—which remains unchanged—that so far as our means of observation have existed, we have been unable to detect any special disease in the brains of the insane.

With respect, however, to *general paralysis or palsy*, it is again stated in the second annual report of the Somerset Asylum for 1849, that subsequent *post-mortem* examinations have confirmed the observations in the previous report, that fatal cases were found to be accompanied by, and probably dependent on, softening of the spinal marrow, frequently combined with inflammation of the membranes and fluid in the ventricles of the brain. The attention of pathologists is called to this important subject, as by no English writer has any allusion to it been made. The report goes on to state:—Although so little seems to be known respecting the pathological anatomy of general paralysis, which has of late years been recognised as a distinct, frequent, and most fatal disease of the insane, it results from my observation that there is no affection of the nervous centres occurring in insanity which presents so well marked and constant morbid changes; and these are seated in the spinal cord, although the brain or membranes are commonly implicated. These changes are chiefly inflammation of the cord itself or its membranes* (meningo-myelitis), thickening and preternatural adhesions of the arachnoid, softening, induration, enlargement, or atrophy of the spinal cord itself. In the brain were found thickening of the arachnoid membrane; with fluid at the base of the skull and in the ventricles and spinal canal, and a roughness from crystals (?) as if minute particles of sand were sprinkled on the floor of the fourth ventricle, and sometimes to a slighter extent also on the lining membrane of the lateral ventricles. It may further be observed that general paralysis or palsy sometimes precedes the mental derangement. This would occur where the spinal cord first became diseased, and disease afterwards attacked the brain. Such cases originating in the spinal cord are most likely to be checked if detected early. General paralysis is, however, most frequently preceded by some form or other of insanity, and is commonly in such cases the certain forerunner of a more or less speedy and fatal termination. It must continue to be so unless a more precise knowledge of its true nature should lead us to a corresponding improvement in its medical treatment.

The acute cases of palsy—or those in which this disease

* Mr. Gulliver, having had several specimens of spinal cord in cases of general paralysis submitted to him, states (M., vol. iv., p. 364), "In December, 1850, I examined the lower part of the spinal cord carefully. The central softening is most distinct, having all the peculiar characters in its ultimate structure well known to belong to this affection. See Bennett's papers and my notes to your contributions. Edinburgh Medical and Surgical Journal, No. 156."

was of short duration and death ensued quickly, were distinguished by softening of the spinal cord, and in one case by enlargement of it. In the last of these fatal cases which took place in that year the symptoms of palsy only existed for four or five weeks; death occurred rather suddenly, after a fit. There was softening of the spinal cord and a considerable quantity of fluid in the ventricles of the brain.

The chronic cases of palsy, those in which the fatal termination did not occur for several months, were distinguished by induration, sometimes by atrophy of the spinal cord, and by thickening of its membranes.

There were in 1848 four fatal cases, and in 1849 seven fatal cases in males; in females, there was one fatal case in each of those years.

In 1850 there were seven fatal cases of general paralysis in males and four in females. In one female the disease appeared to be caused by a fibrous and fatty tumour, proceeding from the upper part of the spinal cord. In the other cases the morbid changes were wasting of the spinal cord, inflammation, with softening and induration of its substance, as well as inflammation, preternatural adhesions, and thickening of its membranes. These changes were generally connected with similar changes in the brain and its membranes.

A striking example of general paralysis occurred in a male who died at the close of the year. He was a weaver, aged 48, and was admitted into the asylum in June, until which time he had worked at his trade, but had recently spoiled forty yards of cloth, and had become violent in his conduct. His wife stated that for six months prior to his mental derangement she observed he rather tottered in walking, that his lips and tongue quivered, and his articulation became indistinct; afterwards he was wont to laugh at trifles, and had the appearance altogether of an intoxicated person. These symptoms gradually increased after he was placed under my care. He was of a ruddy complexion, very cheerful, and anxious to go out into the fields. A month before his death he had an attack of diarrhœa, of which he soon got better; but ever afterwards his strength failed, and he was confined entirely to the house. On the 12th December he was seized with violent convulsions, principally affecting the right side; these continued without abatement or relief from treatment for four hours, when he died. On examination after death, there was found abundant evidence of chronic inflammation

of the membranes of the brain, and of chronic inflammatory softening of the brain and spinal cord. It was observed that the inflammation appeared to have been more intense in the ventricles of the brain. The primary symptoms, as stated by his wife, would indicate that in this case the disease commenced in the spinal cord and extended to the brain.

In the year 1851 there were seven cases of general paralysis in males and one in females, accompanied by the usual inflammatory softening and sometimes induration of the spinal cord, and generally of a part of the brain itself. In most cases the disease appeared to have originated in the brain, the mental faculties having been observed to be weakened before the paralytic symptoms manifested themselves; in some instances the paralytic symptoms were first observed, and the mental weakness succeeded. The last of the female cases but one, that was fatal during the year, is singular. She had been a cripple for several years, her knees firmly contracted; when sitting up they were on a level with her chin, and her heels close to the backs of the thighs. The lower position of the spinal cord, to the extent of $1\frac{1}{2}$ inch just above the tail continuation, was dark coloured and softened; a portion of it was submitted to microscopical observation by Mr. Gulliver, who, without knowing anything whatever of the case, described it as differing from the inflammatory softening most commonly occurring with the characteristic exudation corpuscles in the cases of general paralysis. He found that the ultimate nervous structure was merely disintegrated or broken down—a simple solution of continuity of which Dr. Bennett has described examples in the brain.

In 1852 there were seven cases of general paralysis in males and four in females. In the report for that year it is stated that the fatal cases from this complication were found to be accompanied by disease of the spinal cord, the result of inflammation in which the ventricles and membranes at the base of the brain were generally implicated. Further experience corroborates this statement, and it has rarely happened that there could not be detected a sufficient amount of disease in the spinal cord or base of the brain to lead to the fair presumption that the symptoms were to some extent dependent on this cause. In addition to the evidence afforded by a *post-mortem* examination, a portion of the diseased parts was in most instances subjected to a microscopical examination by Mr. Gulliver, who found that the “exudation cor-

puscles" were most frequently present in the spinal cord itself, and were similar to those delineated and described by Dr. Bennett in his paper on inflammation of the nervous centres.*

In 1853 there were nine fatal cases of general paralysis in males, accompanied by inflammation of the spinal cord.

From the report of 1854 it appears that ten of the deaths, eight males and two females, being 17 per cent. of the mortality for that year, were from *general paralysis*. The dura mater was firmly adherent to the skull in one male, the arachnoid membrane was thickened in one male, the cerebral ventricles contained an unusually large quantity of fluid in four males, there was congestion of blood in the brain in two males, and in one of these the brain was very large, weighing 57 ounces. Disease of the spinal cord, which appeared to be the result of inflammation, was found in all the cases; the spinal cord was unusually red in one case, softened in four, preternaturally firm in three, and in one the spinal canal contained a large quantity of fluid. In the two females the spinal cord was softened, and in one case in which it was subjected to microscopical examination "exudation corpuscles" were evident in it, also in the brain; in this case, too, the brain was wasted, and nearly half-a-pound below the average weight. In the other female there was effusion of blood on the brain and atheroma of the cerebral arteries, and it was a quarter of a pound above the average weight. In those cases which were of longest standing, the brain was usually wasted, and below the average weight; in two cases weighing less than 41 ounces, whereas in some cases of a few months' duration, the brain was considerably above the average weight of 46 ounces in the male; in the cases collectively the average weight of the brain was a $\frac{1}{4}$ oz. in the males, and $1\frac{3}{4}$ oz. in the females, below the average weight in the sane. Hence it appears that in general paralysis of long standing, the brain is below the average weight in the sane.

In 1855 the mortality from general paralysis alone was 13 per cent. of that for the year; it included seven males and one female. In three males and one female the spinal cord was softened; there was central softening of the brain also in the female; in two of the males the dura mater was adherent, and in one there was inflammation of the arachnoid and pia mater; in one male there was a large quantity of

* Edinburgh Medical and Surgical Journal, vol. lvi.iii., p. 36.

fluid in the arachnoid on the right cerebral hemisphere and in the spinal canal; in one male a small portion of the spinal cord was disintegrated; in one male the spinal cord was unusually firm; in one male in whom the symptoms of general paralysis were strongly marked, following an injury to the spine, no *post-mortem* examination was made. In one male idiot who had general paralysis the dura mater was adherent, and the lower end of the spinal cord softened; the brain weighed $39\frac{1}{4}$ ounces. In the six males the brain varied in weight from $35\frac{3}{4}$ to 52 ounces, the mean weight being the usual average of 46 ounces; in the female the weight of the brain was $41\frac{3}{4}$ ounces. As before observed, in those cases in which the brain was smallest the disease was of longest standing.

In 1856 the mortality was unusually low, and there were only three deaths in males from general paralysis; being nearly 19 per cent. In 1857 the mortality from general paralysis was 19 per cent., and included seven males and two females.

In 1858 there died five males and one female—nearly 17 per cent. of the mortality—from general paralysis.

In the twelfth report, 1859, a very large proportion—23 per cent.—of the mortality was from general paralysis, including eight males and three females. The spinal marrow was softened in four males and two females, was indurated in five males and three females, and atrophied, with effusion of blood, in one male; there was an unusual quantity of fluid in the spinal canal in four males. The average weight of the spinal marrow in seventeen males was a little over one ounce, and in sixteen females .98, a fraction less than an ounce.

In 1860 there were five fatal cases of general paralysis in males.

From the obituary of 1861 it appears that a very large proportion of the males had general paralysis; thirteen out of twenty-nine who died were affected with that disease. No female died from it. The proportion was nearly 45 per cent. of the mortality in males and 30 per cent. of the whole mortality for that year. There was much blood in the spinal cord, and the central portion was softened in one male. There was about one ounce of fluid in spinal canal, and the cord was softened in one male; in five males the spinal cord was unusually soft, and in three males unusually firm; granular bodies were seen like beads amongst the nerve tubes of softened portion of spinal marrow in one male; exudation

corpuscles were observed by microscope from softened portions of spinal cord in one male; the sheath of the spinal cord was adherent in places, red and rough, and studded in several places with bony spicula in one male.

In 1862 there were six fatal cases of general paralysis in males, and one in females. There was blood in the spinal canal in two males, and softening of the cord in four males and one female.

In 1863 there were ten deaths in males from general paralysis, none in females. Fluid blood was found in the spinal canal in three cases; in one the cord was unusually firm, in the others it was partially softened, as most commonly is the case.

In 1864 there were eight fatal cases of general paralysis in males, and one in females, being $12\frac{1}{4}$ per cent. of the mortality in that year.

In 1865 there were four fatal cases of general paralysis in males and two in females, being 10 per cent. of the mortality in that year.

In 1866 there were the same number of deaths as in the previous year, namely—four males and two females, being nearly 10 per cent. of the mortality, from general paralysis.

In 1867, the mortality from general paralysis was five males and one female. At the commencement of 1868 the seven cases following were under treatment in the County Somerset Asylum.

Case I.—A draper's assistant, aged 33, married; first attack; duration 2 months; was admitted to this asylum May, 1864, in a state of melancholia. The cause unknown. *Previous History*—Father dead, mother alive; youngest of 10 children; disposition affable, temper cheerful, habits industrious, education good, religion Church of England. *Present State.*—(Physically) general health bad, pulse 66, tongue clean, skin warm, appetite ravenous, bowels costive, sensations dull, expression dejected, dark irides and hair. (Morally) conduct dangerous to others, silent generally, ideas that people wish to poison him, memory indifferent, affections changed, propensities to strip himself. *Additional Particulars.*—Very obstinate, could not be managed at home, mopes about, sleepless. Placed in the infirmary, ordered an aperient; four days afterwards it is reported that he required to be fed once; has since taken food. At the end of two months, in July, there was no improvement; he was confined to bed for a burnt foot contracted in the Turkish bath. In September he was dirty in his habits; he was blistered on nape of neck. In October he had improved, assisted the infirmary nurse. Nov. appeared quite rational,

in good bodily health, anxious to go home. Discharged on probation. December, discharged from the books recovered. Two years afterwards, in December, 1866, re-admitted; second attack, duration 9 months; transferred from another asylum; health indifferent, in a state of melancholia. January 11, in No. 1, idle, takes his food well. Jan. 27, sent to the infirmary, has retention of urine; catheterism, blister ordered to nape. Feb. 10, able to come downstairs; pallid, ordered citrate of iron and ammonia. July 15, has been out playing cricket; medicine suspended. Dec. 24, convulsed, ice applied to the head, which was hot; extremities cold, hot bottles to feet, blister to nape, catheterism required, croton oil given. Dec. 30, able to sit up in No. 4 corridor, he has generally a book before him, unable to take exercise, appetite good. Hair rapidly getting grey. 1868, Feb. 1, had another fit, was comatose for 48 hours, blister to nape, croton oil given. Feb. 9, is able to sit up in the corridor. Feb. 16, very stubborn, unwilling to be dressed or undressed, has not spoken since his attack in December, stares at anyone who speaks to him, pupils dilated, appetite good; dirty, will not go to the closet, staggers in walking, becoming feeble and emaciated. Feb. 18, has a vacant look, more helpless, temperature low, bulb of thermometer in axilla 96 deg.; in mouth between cheek and teeth, lips closed, 97 deg.; felt point of a pencil drawn along the soles of his feet. March 6, unable to sit up. March 17, very much convulsed on one side, mouth drawn and head turned towards the right side. Swallows a little fluid with difficulty. 19th, Quite helpless; seems to know persons, but never attempts to speak. Died on March 21. Autopsy, March 23. Weight of body 100 lbs.; length, 5 feet 5 inches. Head, circumference, 22 inches, antero-posterior measurement, $11\frac{1}{2}$ inches; transverse, 11 inches. Opacity of the arachnoid membrane, the lateral ventricles distended with fluid, the brain unusually pale, each cerebral hemisphere weighed 16 ounces, the cerebellum 5, and the medulla oblongata 1 ounce, the encephalon 38 ounces, but when removed from the skull before being cut and the fluid escaped, the encephalon weighed $39\frac{1}{2}$ ounces. There was blood in the spinal canal, the spinal cord appeared enlarged and softened, weight $1\frac{1}{2}$ ounces. Chest: pleuritic adhesions on both sides, pneumonia in first stage in both lungs, the right weighed 31, the left 23 ounces; heart small, $6\frac{1}{2}$ ounces. Abdomen: the intestines natural, stomach 5, liver 46, spleen $3\frac{1}{2}$, right kidney $9\frac{1}{2}$, left 5, renal capsules $\frac{3}{4}$, pancreas 3 ounces. Cause of death, arachnitis, myelitis, double pneumonia.

Case II.—H. C., a tailor, aged 34, single; first attack, duration 11 months, was admitted in July, 1866, suffering from mania and general paralysis. *Previous History.*—Father dead, mother alive, disposition stubborn, temper irritable. Education: can read only; religion: Church of England. *Present State.*—(Physically) general health bad, pulse 54, tongue white, skin cool, appetite good, motion imperfect. (Morally)

conduct dangerous to others, conversation unconnected, ideas wandering, memory bad, propensities to expose his person. *Additional particulars*.—Two months in the workhouse, speech thick, totters in walking. Aug. 3, in the infirmary helpless and irritable, has difficulty in coming downstairs. Aug. 25, is improved and working in the tailors' shop. Five months subsequent to this date the paralysis became more marked, though he was still able to assist in the tailors' shop; gradually getting worse he had to be removed to the infirmary in January, 1867. Has been taking medicine, but seems to have derived no benefit from it up to December, 1867. 1868, Feb. 4. Pulse 56, appetite good, tongue white and tremulous like the lips, speech muffled and indistinct. Unable to feed himself or to walk without assistance, passes his feces and urine involuntarily, sometimes he cries when he wets the floor, is in a state of dementia, destroys his clothing; blisters applied to hollow of the loins. Feb. 10, blistered surfaces have healed, still dirty in his habits, he has another blister applied to nape of neck, and is taking bichloride of mercury, and cod liver oil. Temperature in axilla 94 deg., under tongue 95 deg., is very feeble. Pulse 84 and intermittent. March 2, has had a severe attack of convulsions which left him in a comatose state for 24 hours; was almost pulseless, surface of body and extremities very cold, pupils contracted to a size of small pin's head. Ordered wine, hot bottles to sides and feet, and blister to nape of neck. He rallied. March 9, confined to bed, cannot keep the bed clothes on, but kicks them about; grinds his teeth. Is still taking wine. March 17, fed with fluids, swallows with difficulty. 24th, in a moribund state; died 25th March; autopsy 20 hours after death. Weight of the body 87 lbs., length 5 feet 5 inches. Head: circumference $21\frac{1}{2}$, antero-posterior $12\frac{1}{2}$, and transverse measurement 11 inches. Slight opacity of the arachnoid membrane; the lateral ventricles distended with fluid; roughness, as if fine sand had been sprinkled over the corpora striata, which were unusually dark coloured; the cerebral structure was firmer than natural, each of the cerebral hemispheres weighed $18\frac{1}{4}$, the cerebellum $5\frac{1}{4}$, the medulla and pons 1 ounce, encephalon 44 ounces. The spinal cord was unusually firm, weight $1\frac{1}{4}$ ounce. Chest: pleuritic adhesions; the right lung in second stage of pneumonia, weight 48 ounces, the left lung natural, weight 14 ounces; heart small, $6\frac{1}{2}$ ounces. Abdomen: intestines natural, stomach 5, liver large, $59\frac{1}{2}$, spleen 4, pancreas $2\frac{1}{2}$, right kidney 6, left $5\frac{1}{2}$, renal capsules $\frac{3}{4}$ ounce. Cause of death, chronic cerebro-myelitis and pneumonia right lung.

Case III.—G. G., a shoemaker, aged 40, married, has two sons; second attack, was admitted for the first time in June, 1866, suffering from melancholia caused by destitution. *Previous History*.—Father alive, mother dead, eldest of four children, disposition quiet, temper good, habits industrious. Education: can read only; religion: Church of England. *Present State*.—(Physically) health indifferent,

pulse 96, tongue clean, skin hot, appetite indifferent. (Morally) conduct dangerous to himself and others, conversation threatening, propensities to be indolent and to ramble about at night. He was inclined to be noisy at first, but after a little time he altered in this respect, and was sent out to work. In August he was much improved in body and mind, and was recommended for discharge in September following. He was discharged recovered Oct., 1866. He was readmitted in November, 1867, in a state of melancholia and general paralysis. He walks with difficulty, tremulous voice, reported not dirty in his habits, appetite good, silly laugh, pulse 72, tongue clean, skin cool. Has a large scar in his throat, where he had attempted to cut it. 1868, Jan. 23, in the infirmary, very helpless, cannot go to bed without assistance. Feb. 6, tongue clean and tremulous, pulse 96, appetite good, has to be assisted in walking, getting worse, can feed himself, though his hand is very unsteady, spills fluids, passes his motions involuntarily, speech imperfect, lips tremulous, pupils unequally dilated, right more so than the left, sight gradually failing. Ordered a blister to neck, which did not act. Feb. 18, temperature under tongue 100 deg., in the axilla 95, temperature of room 65, pulse 120, has sensation perfect in the soles of his feet, and when tickled with a feather he felt it at once. Is still in bed in the infirmary, feces and urine passed involuntarily, takes his food well. Is gradually getting worse. Taking bichloride of mercury; he had blistering fluid applied to bottom of loins. Is extremely dirty in his habits; is occasionally very noisy at night, shouting, blaspheming and preventing the other patients from sleeping. March 10, helpless, requires to be fed. April 5, gradually sinking; died April 6. Autopsy 34 hours after death. Head: circumference, $22\frac{1}{2}$, antero-posterior 12, transverse 11 inches. Opacity of the arachnoid, more fluid than natural in the cerebral ventricles; each hemisphere $17\frac{1}{2}$ ounces; cerebellum $5\frac{1}{4}$, medulla and pons 1, encephalon $41\frac{1}{4}$ ounces. Spinal cord soft throughout, $1\frac{1}{4}$ ounce. Thorax: organs natural; right lung 20, left 18, heart 10 ounces. Abdomen: the intestines healthy, stomach 6, liver large, 60, spleen large, $10\frac{1}{4}$, pancreas $2\frac{1}{4}$, right kidney $4\frac{1}{2}$, left $5\frac{1}{4}$, renal capsules $\frac{3}{4}$ ounce.

Case IV.—A. L., a labourer, aged 24, single; first attack, duration 6 months; was admitted March 29, 1867. He was then suffering from mania, due to hereditary predisposition. *Previous History.*—Parents alive, third of nine children, stubborn, temper irritable, habits idle; education, can read and write; religion, Church of England. *Present State.*—(Physically) general health good, pulse quiet, tongue clean, skin cool, appetite good. (Morally) conduct violent to others, conversation connected, memory good, affection changed, propensities to wander. *Additional particulars.*—Has been violent to his father and attempted his life. April 5, is quiet, appetite good, sleeps well. May 31, is out at work and improved. In July his walk was lamer,

and in the following month he had to be sent to the infirmary as he was getting quite helpless. Aug. 21, his spine had been blistered and he required croton oil, the bowels having become confined. His mother visited him, but he did not speak to her. The bowels still continuing obstinate he was ordered some more croton oil. 1868, Feb. 6. Pulse 96, appetite good, tongue clean; is able now to walk and feed himself. Dirty in his habits, his motions pass involuntarily. Spine has been blistered, and he is taking bichloride of mercury. If not prevented, he is in the habit of constantly kneeling on the floor, and his knees have become very sore thereby. Feb. 18. Feels the point of a quill when applied to the soles of his feet. Temperature under tongue, 98; in axilla, 96; in the room, 65 degrees; face flushed. March 28, ordered phosphate of strychnine, and to get up daily. July 12, confined to his bed in the infirmary with severe attack of conjunctivitis. Is improving daily. Mental condition much more hopeful. Oct. 11, Mental condition less encouraging. Bodily health good. 1869, Jan. 1, not improved; in the infirmary. April 5, in No. 1; health improved, but shows no mental change. 1870, Jan. 27, in good health; mentally no change; employed daily at the Quarry. Feb. 27, now in the infirmary for the last fortnight; has a light attack of rheumatic fever; relieved by alkalies. March 24, examination of chest. By percussion, sounds natural. By auscultation, anteriorly tubular breathing right side. Pulse 100, tremulous. Aug. 12, now in good health. Picks coir. Mentally no change. 1871. Jan. 19, in good health. Childish in manners. Generally picks coir. He seems to have sunk into a state of chronic dementia. With the exception of a hesitation and slowness in speaking, there are now fewer symptoms of general paralysis than formerly. He walks with a slight stoop and shuffle, but his health and appetite are very good. He has been under no special medical treatment recently.

Case V.—Wm. L., a pensioner, aged 56, married, has one son; first attack, duration two weeks, was admitted July 15th, 1867, suffering from mania and general paralysis. *Previous History.*—Parents dead, disposition stubborn, temper violent, habits dirty; religion, Church of England. *Present state.*—(Physically) general health indifferent, pulse feeble, tongue white, skin cool, appetite good; sensations, blind and deaf, motion perfect, expression dull. (Morally) conduct violent to others, conversation obscene, ideas exalted, affections altered, propensities to swear. *Additional particulars.*—Has been blind for some years; noisy at night. July 19. Cannot walk without assistance; ordered a Turkish bath and was afterwards sent to the infirmary; is gradually become more helpless, and he is reported as being in Nov. confined to bed in the infirmary with well marked symptoms of paralysis. Dec. 28. Is very feeble and gradually getting worse, obstinate and abusive when requested to do anything. Feb. 8, 1868. Still in bed, in much the same state, temperature of

room 65 deg.; would not allow the thermometer to be placed in his mouth or axilla, and became excited and violent when an attempt was made to do so. March 10. Still bedridden, passes his feces and urine involuntarily and unconsciously. Is able to feed himself, takes his food heartily; had his neck blistered, and is taking bichloride of mercury.—From Case Book:—Oct. 11, confined to bed, quite helpless; requires to be fed; can only swallow fluids; deglutition imperfect. Nov. 1, seized by a fit of convulsions; sank rapidly and died the same day. Autopsy 19 hours after death. Weight of body 98 lbs.; length 5 feet 7 inches. Head: circumference, $22\frac{1}{2}$, antero-posterior $12\frac{1}{2}$, transverse 12 inches. A sanious fluid in arachnoid sac; dura mater of a yellowish tinge, and coated by a pulpy substance. Brain very much congested with blood, and softened in the deeper part of the anterior lobes. Each hemisphere weighed 19 ounces, cerebellum 5, medulla and pons $1\frac{1}{2}$ ounce. Spinal cord softened throughout, softening more distinct in some places than in others, $1\frac{1}{4}$ oz. (sent to Dr. Clarke). Chest: both lungs in the first stage of pneumonia, right 31, left 25 ounces; heart 9 ounces: a deposit of fibrine in walls of aorta and about the base of the semilunar valves. Abdomen: liver 41, nutmeggy, stomach $5\frac{3}{4}$, pancreas $2\frac{1}{2}$, spleen $2\frac{1}{2}$, right kidney $4\frac{1}{2}$, left $4\frac{1}{4}$, capsules, $\frac{3}{4}$; intestines thin. Cause of death, cerebritis, myelitis, double pneumonia.

Case VI.—S. B., a stableman, aged 46, married, first attack, duration five months; admitted Jan., 1868, in a state of general paralysis and dementia, caused by a bullet rebounding from a target and striking him on the head when employed as a marker at a rifle range. *Previous History.*—Parents alive, only child, disposition quiet, temper good, habits intemperate; education, can neither read nor write. *Present state.*—(Physically) general health bad, pulse 90, tongue clean, skin cool, appetite good, sensations dull, motion imperfect, staggers about, expression silly, hazel irides, black hair, sallow complexion. (Morally) conduct violent to others, conversation about his wealth incoherent, ideas that he is rich, memory lost, affections not changed, propensities to destroy clothing, &c. *Additional particulars.*—Staggers in walking. Feb. 3. Very noisy and violent, had to be placed in the strong room. Feb. 6. Pulse 108, appetite good, bowels regular, utterance thick and indistinct, speaks as if he had a plum in his mouth, walks with his legs wide apart, does not stagger, not dirty, has control over sphincters. Feb. 18. Seems to have more difficulty in walking, is very obstinate; it was quite impossible to take the temperature of axilla and mouth, as he struggled directly the attempt was made, and almost broke the thermometer; pulse 96, no sensation in the soles of the feet. March 11. Staggers in walking, is unable to lift a cup of water to his mouth without spilling it; quite unable to protrude his tongue, is becoming emaciated, wets the bed occasionally, appetite still good, lisps a little when he speaks, speech almost unin-

telligible, due perhaps to loss of control over the tongue, cannot keep his eyes closed very long, pulse 84. March 20, gradually sinking, helpless, confined to bed, no power over sphincters. Died 24th March. Autopsy 30 hours after death. Weight of body 100 lbs., length 5 feet 7 inches. Head: circumference $21\frac{1}{2}$, antero posterior 12, transverse measurement $10\frac{1}{2}$ inches; opacity of the arachnoid membrane, there was an unusually large quantity of fluid in the lateral ventricles and central softening of the brain; each cerebral hemisphere weighed 19, cerebellum $4\frac{3}{4}$, medulla and pons $\frac{3}{4}$ ounce; encephalon 44 ounces. The spinal cord was unusually firm, weighing $1\frac{1}{4}$ ounce. Chest: pleuritic adhesions on the right side only; there was recent lymph on the under surface of the right lung, which was in the first stage of pneumonia, $39\frac{5}{4}$, left 12 ounces, natural; heart $8\frac{1}{2}$ ounces. Abdomen: recent lymph on descending colon; stomach 5, liver 54, spleen 3, pancreas $2\frac{3}{4}$, each kidney $5\frac{1}{2}$, renal capsules 1 ounce. Cause of death, central softening of brain, chronic myelitis, and pleuro-pneumonia of right lung, colitis.

Case VII.—W. B., an artist, aged 54, married; admitted in May, 1863; he had been ill one month; two years previous he was in Paris, and under treatment for one month at Charenton; form of disorder on admission, general paralysis combined with mania; bodily health bad, appetite good, expression silly, conduct violent to others, conversation incoherent, ideas exalted, memory bad, affections lost, propensities destructive; he was suffering from diarrhœa, hæmorrhoids, and stricture of the urethra, for which he was at once placed under medical treatment. On the 4th June reported as still in a very feeble state, mischievous and quarrelsome, had picked sores on his face and hand, dirty in his habits; ordered bichloride of mercury and iodide of potassium, which he continued to take until December, a period of six months, his bodily health improving. February, 1865. His mental state not improved, very dirty in his habits, and indolent. In May, reported as more tranquil. In October, very feeble, and ordered stimulants; in the infirmary. January, 1864. Health better, removed from infirmary; quiet, still very slovenly, ideas exalted, employs himself in drawing. January, 1866. Health good, no mental improvement. In October reported as cheerful, reads and writes a good deal. January, 1867. In good bodily health, habits slovenly, cannot be induced to wear stockings, and prefers lying on the floor to his bed. In April painting portraits, very quiet and cheerful, dirty habits not improved, writes letters to great people, his ideas still exalted. February, 1868. Health good, no improvement in his mental condition or slovenly habits. In this case the paralytic symptoms have gradually disappeared, leaving the mental disorder less acute, but still deranged, the ideas continue exalted, he is in the habit of writing to Government Ministers and officials in a grandiloquent style. Other cases, as Nos. I., III., and IV., have been benefited for a time by similar

treatment, long continued use of alterative doses of mercury and iodide of potassium. From Case Book:—Oct. 29, health declining, of dirty habits, ptosis of right eyelid, does not paint. Dec. 28, in a very feeble state in the infirmary, has a bed sore, refuses wine and medicine. 1869, Jan. 1, gradually sinking, still conscious. Jan. 9, had an attack of convulsions, in which he died. His body was removed for burial by his relatives; no *post mortem* examination was allowed. Cause of death, general paralysis.

The report of Cases IV., V., and VII., since 1st July, 1868, are from the Case Books, for which I am indebted to Mr. Power, the Assistant Superintendent of the County Somerset Asylum.

General Paralysis, or an incomplete and peculiar form of palsy, not mentioned by the older writers, was minutely observed by the French physicians, Boyle, Calmeil, Delaye, &c. It was first noticed by Esquirol in 1805, as a frequent and fatal complication in insanity. It is described as consisting of a general and gradual loss of power in the voluntary muscles, a tremulous motion of the tongue and lips, first observed with indistinct articulation or a faltering in the speech, and a difficulty often in pronouncing the letter R. When protruded the tongue does not incline to one side. A similar embarrassment is observed in the gait, and lastly, in all the muscular system.

The patient walks stiffly, deviates to one side, stumbles going over a step; still, he perseveres and takes pleasure in walking about; is restless and desires change. In attempting to run, his course is like a drunken person; he stumbles, and frequently falls. A state of morbid tension exists in all the muscles, he comes awkwardly down on the soles of his feet, the arms and hands now become stiff, his arms are extended, objects are grasped convulsively and sometimes suddenly let fall, the eyelids are widely open, the jaws firmly closed, sensibility becomes blunted. The paralysis is often more marked on one side of the body than the other. At first it is partial, it then invades a greater number of muscles and becomes general. Its progress is regular, it goes on constantly increasing, language is replaced by confused sounds, while the understanding grows weak, a melancholy stage usually exists, and Prichard states that whatever character the disorder of the mind may have presented, it soon passes into a state of chronic dementia. The special senses generally remain to the last. The cutaneous sensibility is usually blunted, but it occurs in transitory states that the slightest touch excites extended

reflex movements, occasionally preceding convulsions ; after each attack there is an increase of the paralysis, and of the mental dullness. Digestion is disordered and constipation is usually a most persistent symptom.

Three distinct stages have been recognised by writers. In the first there is rigidity of action ; the movements, although uncertain, retain a certain vigour. In the second stage there is a relaxation, or a state of resolution always increasing, of the muscular structure. The patient at last lies prostrate ; the parts pressed upon become excoriated and ultimately gangrenous. The excretions are involuntary, convulsions and coma supervene, which continue for many hours, and are frequently repeated for several successive days. After these seizures the malady usually proceeds rapidly to its fatal termination.

The first symptoms are usually psychical ; in the majority of these cases the paralysis succeeds the intellectual disorder. The motory disturbances occur in individuals already mentally deranged, and appear years or months after the psychical symptoms. Perversions of the character are sometimes observed and violations of property, from the idea that the objects belong to them or from an irresistible desire to gratify an impulse. The first symptoms are generally accompanied with vague delirium of mania ; some have very extravagant ideas. In the later periods these ideas disappear. The weakness of the mental faculties become more profound as the paralysis becomes more marked. In the advanced period they become emaciated and require to be fed : at first they are greedy, and the nutrition is well maintained. At the last gangrenous spots appear on the skin, abscesses form, hectic fever and pyæmia occur in some ; others have diarrhœa, pneumonia, bronchitis, or pulmonary phthisis, as the fatal terminations. In a few the paralysis precedes the mental derangement. Baillarger goes so far as to declare that the paralysis is the primary and leading symptom of the disease, and the insanity secondary and accessory. It should, however, be kept in mind that a general paralysis similar in all respects to that now described, occurs sometimes without being followed by insanity, as has been observed by Delaye and Foville, who saw induration of the spinal cord with effusion of serum in two cases of general paralysis unattended by insanity. Three cases have occurred within my own knowledge recently. One was the case of an officer retired from the army, after 35 years' service, who for several years pursued country sports, riding,

shooting, fishing ; at length, when about 70, he was attacked with what was termed creeping palsy, ushered in by faintings ; he was for some months confined to bed, pulse feeble ; he got bed sores and gangrene ; he very slowly and gradually sank ; his intellect remained clear to the last. The disease in his case followed an upset from a conveyance. The other two cases occurred in men of tall stature, one a member of the clerical the other of the legal profession : the paralytic symptoms lasted for about three years, kept gradually increasing until they became bedridden, were unable to articulate, feed themselves, or answer the calls of nature. Although physically so feeble, there was no mental derangement in either case.

A case of general paralysis without mental disorder, remarkable for the want of power to raise the foot over the slightest obstruction, and which continued for fifteen years, was that of a gentleman engaged in an arduous profession. Until the last three years before his death he was under the care of a practitioner, who prescribed a generous diet, tonics, ammonia and “*Liquor secale cornuti*” in doses of ten drops three times a day, from which the general system derived benefit.

Railway accidents, causing concussion to the spine, are likely to be followed by general paralysis.

In cases of *general paralysis* some obvious disease of the cerebro-spinal organs is invariably found to exist. It is supposed to be more frequent in Paris than elsewhere, because it has been more accurately observed there. The proportion is 1 to 4, according to Boyle ; Baillarger states it to be at Bicetre and Salpetriere 1 in 16. In Vienna 12 and at Florence 18 per cent. of the admissions have this complication (vid. Griesinger on Mental Diseases, p. 401). Dr. Burrows has stated it to be a comparatively rare disease in England.

Out of 924 deaths in the County Somerset Asylum, 162, or nearly 18 per cent., have had this disease, and the proportion of males to females was just 4 to 1. The youngest male was 26 and the oldest 75 ; the age at which it was most frequent was 37 to 47 ; in the decennial period from 30 to 40 there were 40, from 40 to 50 there were 53, from 50 to 60 there were 23, from 60 upwards only six cases. The married greatly exceeded the single.

A tedious and fatal disease—progressive palsy of the tongue, velum palati, and lips—glosso-pharyngeal palsy, has also been observed by French writers, no co-existent derangement being

perceptible in the sensory nerves nor in those of special sense. The attendant *post-mortem* lesion is an intense fatty atrophy of the palsied nerves, especially the hypoglossal nerve. In some cases a diffuse sclerosis of the medulla oblongata has also been found.* Wachsmuth believes that the seat of the disease is in the olivary bodies and in the grey matter which forms the floor of the fourth ventricle. The atrophy of the nerves is secondary. The *post-mortem* lesion in this disease, so analogous to what I have found in many cases of general paralysis of the insane, as well as the following symptoms, so like the early symptoms of general paralysis, show a close relationship between the two.

In glosso-pharyngeal palsy at the outset the patient makes no complaint. He cannot pucker up his mouth, and hence cannot blow, whistle, or spit. The saliva runs from his mouth. The expression of the countenance becomes blank and strange. As the muscles of the lips cannot take part in the play of the expression, pronunciation of the labial letters is difficult and gradually becomes impossible. If the malady extends to the tongue, not only does articulation become still more embarrassed, but the acts of chewing and swallowing become impeded, and afterwards, when the tongue has become still more helpless—lying quite motionless in the month—these are no longer practicable. Palsy of the palate shows itself from the nasal tone of the voice, and, so long as the pharyngeal muscles remain sound, by the regurgitation through the nose and mouth of food and liquid which enter the pharynx. If the pharynx also become palsied, the patient, when offered drink, rejects a large portion of the liquid with violent expiratory motions, so that at last it often becomes necessary to feed him by means of the œsophagus tube.

In the 20 years, from the opening of the Somerset County Asylum, the 1st of March, 1848, to the 29th February, 1868, inclusive, the cases of general paralysis amounted to $8\frac{1}{2}$ per cent. in the males and 2 per cent. in the females, on the total admissions for that period. The proportion of males to females was as 4 to 1; there were 7 males still under treatment; *post-mortem* examinations have been made in 155; of these, 124 were males, and 31 females. An analysis of these examinations in males and females respectively, have been tabulated according to age,

* Niemeyer's Practical Medicine, Eng. Trans., vol. ii., p. 337.

in decennial periods, showing the date of death, duration, No. of Case, symptoms on admission, cause, summary of treatment, assigned cause of death, *post-mortem* appearances, including five measurements of skull, state of cerebral membranes of each cerebral hemisphere, of cerebellum, of medulla oblongata, and weight of each; condition and weight of spinal cord. Condition and weight of thoracic organs, lungs, and heart. State and weight of the abdominal organs. Weight and length of the body. These tables have been submitted to the printer, who found that they could not be put in a convenient form for the pages of this Journal, and so they have been omitted. If time had permitted some of the earlier cases in the tables, which are of interest, and are pretty fully recorded, might have been added to this paper. The summary of the results are, shortly, as follows:—Under 30 years, 4 cases, the youngest 26, one single and three married; average duration of illness 15 months. The form of the disorder in 2 was mania, in both the ideas were exalted; dementia in 2, and the ideas obscured or lost. Cause assigned—intemperance in 1, cerebral disease in 2, and spinal in 1. Treatment: counter irritants, blisters, moxa and seton in three, bichloride of mercury in two, strychnine in one, cod liver oil for restoration of general health in one. Cause of death, softening of brain and spinal cord, and pulmonary tubercles in 1, fluid in spinal cord in 2, with pneumonia in 1 and pleuro-pneumonia in the other, fluid in the cerebral ventricles, bronchitis and dysentery in 1.

Head: circumference $21\frac{3}{4}$, antero-posterior from root of nose to occipital protuberance 13, and transverse from one external auditory foramen over vertex to the other $13\frac{1}{4}$ ins. Cerebrum: opacity of arachnoid membrane in two and 8 ozs. of fluid in one. There was congestion of cerebral vessels in one, softening in cerebrum in one, excess of fluid in ventricles in one; brain appeared natural in one; the average weight of right hemisphere 18·4; in one case it was $4\frac{1}{2}$ ounces lighter than left; average weight of left hemisphere 19·4; cerebellum large in one case; average weight of encephalon 46·6 ounces. There was an unusual quantity of fluid in the spinal canal in two cases; in 1 there was congestion of blood, and in 1 softening of the spinal cord, average weight of which was $1\frac{1}{4}$ ounce. There was congestion of blood in right lung in 2, bronchitis in 1, and pleuro-pneumonia in 1, average weight 33·5; pleuro-pneumonia of left lung in 2, bronchitis in 1, and tubercles in 1, average weight $26\frac{1}{2}$ ounces; heart natural, average weight

10 ounces. Intestines ulcerated in 2; mucous membrane of stomach discoloured by taking infusion of logwood in 1, average weight 6 ounces; liver congested in 1, weight 58; spleen 6.4, pancreas 3.2, right kidney 4.5, left kidney 5, renal capsules .9, weight of the body 107lbs., length 5 feet 6 $\frac{1}{4}$ inches.

From 30 to 40 years there were 40 cases, of these 10 were single, 31 married, and one widowed; only 12 were remarkable for extravagant ideas; in the great majority the ideas were wandering, the mind was quite lost; in one there was great despondency, one case was combined with idiocy, one with melancholia, 17 with dementia, and three with mania. The causes were from disease of the nervous centres in 22, from injuries or blows on the head in 5, from intemperance in 5, after fever in 5, hereditary and other causes in 5. The treatment varied according to the symptoms, and was generally the same as that stated in the previous cases. The assigned cause of death was from disease of brain and membranes in all the cases, with disease of spinal cord or membranes in 32, there was cerebral apoplexy in 1, and spinal apoplexy in 2; the cerebral was combined with pulmonary disease in 15, bronchitis in 1, pleurisy in 3, pneumonia in 8, and phthisis in 3, diarrhœa in 1.

Head: the skull was unusually dense and thick in 2; the circumference of the head varied from 21 to 23 inches, the average 22.1; the antero-posterior measurement varied from 11 to 14 $\frac{1}{2}$ inches, the average 12.8; the transverse measurement varied from 10 $\frac{1}{2}$ to 14, the average 12.6 inches. The cerebral membranes were natural in 10 cases, the dura mater was preternaturally adherent in 8; a quantity of fluid beneath it in 1, the arachnoid thickened and opaque in 12, fluid on sac of arachnoid in 6, mixed with pus in 1, congestion of blood in the veins in pia mater in 7. The structure of cerebral hemispheres unusually congested in 3, the grey matter unusually dark in 1, and the white matter in 1, fluid in the ventricles in preternatural quantity in 20, structure soft in 3, cerebral structure remarkably tough and firm in 6, roughness or deposits in 4th ventricle in 2, inequalities in size and weight of cerebral hemispheres in 9 cases from 1 to 3 $\frac{1}{4}$ ounces; the variation has been in favour of the right hemisphere in a majority of 3 cases, the right cerebral hemisphere varied in weight from 15 $\frac{1}{2}$ to 24 $\frac{1}{4}$, the average weight 19.2 ounces; the left cerebral hemisphere varied from 14 $\frac{1}{2}$ to 24 $\frac{1}{4}$, the average weight 19 ounces. The cerebellum was unusually

firm in 2, above the usual size in 6 cases, the weight varied from $4\frac{1}{4}$ to $6\frac{1}{4}$, the average weight 5.1 ounces. The medulla oblongata and "pons varolii" varied in weight from $\frac{3}{4}$ to $1\frac{3}{4}$, the average weight 1.6 ounce. The encephalon varied in weight from $35\frac{1}{4}$ to $55\frac{1}{2}$, the average weight 45 ounces. The spinal cord varied in weight from 1 to $1\frac{3}{4}$, the average weight 1.2; there was blood effused in spinal canal in 5, congestion of blood in vessels of cord in 2, fluid in canal 6, there was more or less softening in the cord in 14, the cord was unusually firm and white in 4, corpuscles were found by microscopical examination in 2, white specks on spinal arachnoid in 1.

Chest: the right lung was healthy in 8, there was congestion of blood in 6, bronchitis in 4, pleuritis in 5, pneumonia in 8, pleuro-pneumonia in 6, tubercles in 3, it varied in weight from 11 to 52, average weight 26.5 ounces. The left lung was natural in 13, congested with blood in 4, there was emphysema and bronchitis in 2, pleuritis in 4, with effusion in 1, pneumonia in 9, pleuro-pneumonia in 5, and tubercles in the lung in 4, it varied in weight from $9\frac{3}{4}$ to 66, the average weight 23.3 ounces. The heart was enlarged in 5, below average size in 5, fatty in 1, flabby in 1, valves thickened in 1, it varied in weight from $7\frac{1}{2}$ to $16\frac{1}{2}$, the average weight 10 ounces.

The intestines were for the most part in a healthy state; tubercles in the mesentery in 1, redness or inflammation of colon and ileum in 6, tapeworm in one, fatty omentum in 1. There was melanosis of stomach in 2 cases, it was enlarged in 7 cases, it varied in weight from 4 to $9\frac{1}{4}$; average weight 5 ounces. The liver was congested and enlarged in 6 and atrophied in 3, it varied in weight from 36 to 72, the average weight 53.1 ounces. The spleen was soft in 2, enlarged in 6, below the average in 10, it varied in weight from $2\frac{1}{2}$ to 11, the average 4.8 ounces. The pancreas varied in weight from 2 to 4 ounces, the average weight 3.1 ozs. The kidneys were united, forming "horse-shoe kidney," which weighed 6 ounces in one case; each kidney had an abscess containing blood and pus and double the usual weight, being above 10 ounces in 1 case; the right kidney was enlarged in 1, and the left in 8 cases, the right varied in weight from 3 to $10\frac{1}{4}$, and the left from $3\frac{1}{2}$ to $10\frac{1}{2}$ ounces; the average weight of the right was 5.2, and the left 5.3 ounces. The renal capsules varied from $\frac{3}{4}$ to 1 ounce; in one instance there was softening, the average weight .8 ounce.

The body was emaciated in 10, it varied in weight from 71 to 154 lbs., the average weight was $107\frac{3}{4}$ lbs.; the length of the body varied from 5 to 6 feet, the average length was 5 ft. 7·3 inches.

In the decennial period, from 40 to 50, there were 51 cases—8 single, 40 married, and 3 unknown; the ideas were exalted in 9, wandering in 22, religious in 4, suicidal in 1, acquisitive in 1; the others appeared to be quite lost as far as regards the state of the mind; the duration of the disease averaged $20\frac{1}{4}$ months in 50 cases: the form of the disorder was dementia in 24, mania in 17, melancholia in 8, and in 2 epilepsy was combined with the general paralysis. The causes were apparently from disease of the nervous centres: cerebro-spinal in 21, from intemperance in 11, from fright, grief, religious excitement, and other emotionary causes in 19. As regards treatment, blisters were used in 24, the bichloride of mercury in 15, strychnine in 2, cupping or venesection in 5, and tartar emetic in two cases, anodynes and hypodermic injection in 5. The cause of death was from cerebro-spinal disease, including that of the membranes in all the cases, combined with pulmonary disease in 26, cardiac in 1, with disease of the intestines in 2, of the kidneys in 3, and with erysipelas in 3.

The circumference of the head varied from 21 to 24 inches, the average being 22·4; the antero-posterior varied from $10\frac{1}{2}$ to $14\frac{1}{2}$, the average being $12\frac{1}{2}$ inches: the transverse varied from $10\frac{1}{2}$ to $14\frac{1}{2}$, the average being 12·2 inches. The average weight of each cerebral hemisphere was 19·2, of the cerebellum 5·2, and of the medulla and pons 1; the average weight of the encephalon 45·6 ounces. The dura mater was preternaturally adherent in 10; there was pus in the arachnoid sac and bloody serum over left cerebral hemisphere in 1, fluid in the arachnoid in 4, opacity and thickening of arachnoid in 17, congestion of cerebral vessels in pia mater in 2, bony deposit in falx in 1. The cerebral vessels were congested in 4, more fluid than natural in the cerebral ventricles in 12, the structure was unusually pale and firm in 4 and soft in 2, the grey matter unusually dark in 2; the brain was above the average weight in 15, and below it in 12. There was fetid pus in the spinal arachnoid in 1, the arachnoid was thickened or adherent in 6, fluid in the spinal canal in 4, and blood in 3, there was congestion of the spinal cord in 1; it was softer than natural in 21 and firmer than natural in 7;

the weight of the cord varied from $\frac{3}{4}$ to $1\frac{1}{2}$, the average weight being 1.1 ounce.

Chest: pleuritic adhesions of right lung in 4, of left in 2; congestion of blood in right lung in 8, in left lung in 8, œdema of right in 2, of left 3; pleuritis of right in 2, of left in 2; pneumonia of right lung in 16, of left in 12; tubercles in right in 2, in left in 3; the lungs were natural in 9 cases of right and 15 of left lung. The right lung varied in weight from 11 to $58\frac{1}{2}$, and the left from $10\frac{1}{2}$ to 47 ounces, the average weight of the right 28.3, and of the left 24.5 ounces. The heart was enlarged in 15, and smaller than usual in 13; it varied in weight from $7\frac{1}{2}$ to $14\frac{1}{2}$ ounces, the average weight being 11.1 ounces. Abdomen: there were peritoneal adhesions in 2, redness of intestinal mucous membrane in 4; it was natural in the remainder. The stomach varied in weight from $4\frac{1}{2}$ to 8, the average was 6.2 ounces. The liver varied in weight from 40 to 72, the average weight 58.9 ounces. The spleen varied from $2\frac{1}{2}$ to 11, average 5.4 ounces. The average weight of the pancreas 3.5 ounces. The right kidney was diseased in 3 and the left in 6, in one from a large abscess; it varied in weight from $3\frac{1}{2}$ to 7, and the left from $3\frac{1}{2}$ to 8, the average weight of the right being 5.1, and of the left 6.1 ounces. The body varied in weight from 61 to 157 lbs., the average weight 119 lbs.; the length varied from 5 to 5 feet 11 inches, average length 5 feet $7\frac{1}{4}$ inches.

In the decennial period from 50 to 60 there were 23 cases. It is hardly necessary to go over the particulars, as it would be little more than a recapitulation of the foregoing; the brain was somewhat smaller, the average weight of right cerebral hemisphere was 18.2, of the left 18.5, and of the encephalon 45 ounces; the body 115.8 lbs. At the decennial period 60 to 70 there were only 5 cases. One case reached the age of 75 years.

There were, during the same period of 20 years, 31 deaths from general paralysis in females; 2 were under 30 years of age, 11 from 30 to 40 years, 11 from 40 to 50 years, 4 from 50 to 60 years, and 3 from 60 to 70 years; the youngest was 29, the oldest 68 years of age.

The ideas were exalted in 2, desponding in 3, silly in 1, wandering in 13, suicidal in 3, taciturn in 1, lost in 8. The average duration of illness was 38 months. The form of the mental disorder was mania in 10, melancholia in 7, dementia in 13, and epilepsy in 1. The causes, as far as ascertained,

were from disease of the nervous centres, chiefly or primarily affecting the cerebrum, judging from the degree and duration of the aberration of mind, in 7; spinal in 2, judging from the duration of the paralysis of speech and voluntary motion in walking; cerebro spinal in 8, where a distinction between the intensity of the cerebral and spinal symptoms could not be made; emotional, as from domestic grief, religious despondency in 5, from intemperance in 3, from hereditary predisposition in 1; injury to head in 2, no cause assigned in 3. The treatment was general, for the improvement of the bodily health in 7; for the specific disease in 17, by blisters to spine, seton in nape, the solution of the bichloride of mercury, by stimulants in a few cases, and in one by opiates. The assigned cause of death was difficult to ascribe to any organ exclusively; the brain or investing membranes were diseased in 24, the spinal cord or membranes in 25; the lungs in 10, the intestines in 2, and the kidneys in 1.

The skull was unusually thick in 4; and the diploe injected with blood in 1; the average circumference was 21·8, the antero posterior 12·5, and the average transverse measurement 12 inches. There were preternatural adhesions of the dura mater, or opacity and thickening of the arachnoid, fluid in the sac and congestion of blood in vessels in pia mater in 14. There was fluid in the cerebral ventricles in unusually large quantity in 12; there was roughness on the lining membrane on "*corpora striata*" observed in 2, there was cerebral softening in 3, with an offensive odour in one of them; the cerebrum was unusually firm in 3, congestion of blood in 2, clot of blood in right lateral ventricle in 1, a tumour size of a pigeon's egg in right hemisphere in 1, the cerebral hemispheres natural in 1, atheroma of arteries in 1. In 11 cases, from 30 to 40 years of age, the average weight of the right cerebral hemisphere was 17·5, and of the left 17·5, the average weight of the encephalon 40·9 ounces. In 11 cases, from 40 to 50 years of age, the average weight of the right cerebral hemisphere was 17·7, the left 17·6, the average weight of the cerebellum 4·9, and the medulla 1; at both periods the average weight of the encephalon 40·7 ounces; at the last period, from 40 to 50 years, the spinal arachnoid was adherent in 2, pus in spinal canal in 1, fluid in spinal canal in 4, *cartilaginous* specks on spinal arachnoid in 1, blood in canal in 1; there was congestion of blood in the spinal cord in 1, softening to a greater or lesser extent in 13, the cord was unusually firm in 2, the average weight of spinal cord 1·3 ounce.

Chest: The right lung in a healthy state in 10, the left in 8; there were pleuritic adhesions in 4, emphysema and bronchitis in 5, congestion of blood in lungs in 5, pneumonia in 3, pulmonary tubercles in 1, the average weight of the heart was 8·6 ounces.

Abdomen: There were peritoneal adhesions in 2, more or less redness and inflammation of mucous membrane of intestines in 3; the average weight of the stomach was 5·4 oz., of the liver 42·7, of the spleen 4, of the pancreas 3, of the right kidney 4·2, of the left kidney 4·3, of the renal capsules; the average weight of the body was 91·5 lbs., and the length 5 feet 3 inches.

The cause of death is frequently obscure, and without a *post-mortem* examination cannot be certified with accuracy; if it be done carefully, as a matter of course, no objection is ever made. In every public asylum, hospital, and infirmary, as in naval and military hospitals, a *post-mortem* examination should be imperative, as it is the only way in which the diagnosis of the disease can be established or corrected, and it is by such means our knowledge of disease is to be extended. The public, equally with the medical profession, are interested. All workhouse infirmaries, for instance, should be conducted in such a way as to be made useful as places of medical education for the study of disease and morbid appearances. This would no doubt be the case if workhouse infirmaries were not under the sole control of elected Boards of Guardians, who have power to close them against pupils. The medical profession has thus been forced to provide for the instruction of their pupils other and less adequate means than those which workhouse infirmaries so abundantly afford, by the establishment of hospitals, which only partially provide for the wants of the poor, for the most part being confined to a few medical and surgical wards for adults. Children are not received, nor aged or insane persons, so that the pupils have not the advantage of witnessing the treatment of such cases, which form so large and important a share of their attention when in practice. This want, workhouse infirmaries would amply supply. The mortality from disease in hospitals and infirmaries is found to be much higher than where people are attended at their own homes. Instead of building hospitals the proper and most beneficial succour to the working classes would be to improve their dwellings.